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COMPOSITE CONTAINER MANUFACTURING DEVICE
[Fukugouyouki no seizousouchi]

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[Claims] /2*

[Claim 1] With respect to a device for manufacturing composite containers by disposing a blank sheet inside a cavity formed between a fixed-side template and a core and by injecting a thermosetting resin into the cavity,

a composite container manufacturing device characterized by the fixed-side template being equipped with split molds in an area corresponding to the part of the composite container that protrudes outside the container and by the cavity consisting of a space formed between said split molds and the core and a space formed between the fixed-side template and the core.

[Detailed Explanation of the Invention]

[0001] [Field of Industrial Application]

The present invention pertains to manufacturing devices for composite containers in which blank sheets and thermosetting resins are integrally formed, specifically to manufacturing devices capable of manufacturing composite containers equipped with parts that protrude outside of the containers.

[0002] [Related Art]

Conventionally, so-called pillared containers, which are composite containers in which blank sheets and thermosetting resins are integrally formed, have been utilized.

[0003] In general, a pillared container is a composite container integrally formed by placing a blank sheet, which is a laminate sheet material consisting of layered paper and a resin, inside an injection

* Number in the margin indicates pagination in the foreign text.

molding die and by injecting a thermosetting resin into the joining part at which the ends of the blank sheet are butted together and into the open end, etc. while the blank sheet is retained in a container shape by means of a retaining frame made of a resin. Then, the resin layer on the innermost face of the blank sheet becomes integrated with the injected thermosetting resin through thermal adhesion. As a result, the formed container is provided with a high strength.

[0004] Such pillared containers have the advantages of injection molded articles and the advantages of paper containers and are widely utilized as containers for holding various types of products such as soft drinks, refined sake, powder detergents, deodorizers, liquid foods, etc.

[0005] [Problems that the Invention is to Solve]

However, there is a problem in that the method for manufacturing composite containers such as the pillared containers cannot be used to make containers that have tapped openings and pump-equipped caps attached to the openings such as containers for shampoos or liquid soaps. In other words, when a container is removed from an injection molding die after a blank sheet and a resin have been united by means of thermosetting resin injection, it is difficult to remove it from inside the injection molding die because of the presence of a part, such as a tapped opening, that protrudes outside the container. For this reason, containers equipped with parts that are or similar to the above-described tapped openings have been manufactured by means of blow molding.

[0006] The present invention was completed in light of such a situation, and its purpose is to supply a composite container manufacturing

device capable of manufacturing composite containers equipped with parts that protrude outside the containers such as tapped openings.

[0007] [Means for Solving the Problem]

In order to achieve the above purpose, with respect to a device for manufacturing composite containers by disposing a blank sheet inside a cavity formed between a fixed-side template and a core and by injecting a thermosetting resin into the cavity, the invention has a structure in which the fixed-side template is equipped with split molds in an area corresponding to the part of the composite container that protrudes outside the container and in which the cavity consists of a space formed between said split molds and the core and a space formed between the fixed-side template and the core.

[0008] [Operation of the Invention]

The thermosetting resin injected into the cavity formed between the fixed-side template and the core forms a composite container by being integrated with the blank sheet previously disposed inside the cavity, the portion of this composite container that protrudes outside the container is located in the cavity formed between the split molds and the core, the engagement between the composite container and the fixed-side temperature is released when the split molds are opened, and the composite container can be removed from the fixed-side template together with the core.

[0009] [Embodiment of the Invention]

In the following, an embodiment of the invention will be explained by referring to drawings. Figure 1 is a schematic cross-sectional drawing

showing one example of a composite container manufacturing device of the invention. In Figure 1, the manufacturing device [1] of the invention is equipped with: a fixed-side attaching plate [11] provided with an injection gate [41]; a fixed-side template [12] detachable from the fixed-side attaching plate [11]; split molds, [21a] and [21b], which are provided at the upper part (fixed-side attaching plate [11] side) of the fixed-side template [12] and which are provided with grooves for thread formation; a core [31] provided to a movable-side attaching plate [34] by means of a receiving plate [35]; and a stripper plate [36] provided to a guide pin [42].

[0010] The fixed-side attaching plate [11] is provided with an angular pin [13] that protrudes diagonally downward and away from the core [31] and that is provided with a guide member [14] on its outer side. The angular pin [13] penetrates the split mold [21a] and reaches the interior of a depressed part [15] formed in the fixed-side template [12]. Moreover, the guide member [14] has a surface [14a] that tilts in accordance with the angle of inclination of the angular pin [13] on the split mold [21a] side. Moreover, the face of the split mold [21a] opposite from the split mold [21b] forms a surface that has a tilt corresponding to the angle of inclination of the angular pin [13], and this surface is in contact with the surface [14a] of the guide member. Moreover, a biasing member [16] is provided inside a storage hole [17] provided across the fixed-side attaching plate [11] and the fixed-side template [12]. Because of such a structure, when the fixed-side attaching plate [11] is separated from the fixed-side template [12] and the split molds, [21a] and [21b], by the biasing member [16], the split mold [21a] can move in the direction

(to the right in the illustrated example) in which it moves away from the core [31] by sliding on the periphery of the angular pin [13] and on the surface [14a] of the guide member.

[0011] The upper part of the core [31] is provided with multiple runners [32] that connect the injection gate [41] and the later-described cavity [51]. Moreover, a push-out pin [33] is provided in a vertically movable manner to the approximate center of the core [31], and a flange part [33a] is provided at the lower part of the push-out pin [33]. The above flange part [33a] is located in a slidable manner inside a cylinder part [35a] disposed inside a receiving plate [35], and the cylinder part [35a] is connected to the exterior through a continuous hole [35b]. Moreover, the cylinder part [35a] is also connected to a continuous hole [34a] provided inside the movable-side attaching plate [34]. The cylinder part [35a] is divided into the continuous hole [35b] side and the continuous hole [34a] side by the flange part [33a] in an airtight manner. Therefore, when air or the like is fed to the cylinder part [35a] from the exterior through the continuous hole [34a], the flange part [33a] rises inside the cylinder [35a] and pushes out the push-out pin [33] upward from the flat surface at the upper part of the core [31]. /3

[0012] In the illustrated example, the fixed-side attaching plate [11], the fixed-side template [12], and the split molds, [21a] and [21b], are in contact with one another and the core [31] is inserted into the fixed-side template [12]. In this condition, a cavity [51] is formed in the gap between the fixed-side template [12], the split molds, [21a] and [21b], and the core [31], and a melted thermosetting resin can be injected into the cavity [51] from the injection gate [41] via the runners [32].

[0013] Next, one example of a composite container that can be formed by using the above-described manufacturing device [1] of the invention will be explained by referring to Figure 2 and 3. Figure 2 is a perspective drawing showing one example of a composite container, and Figure 3 is a cross-section viewed from the III-III line of the composite container illustrated in Figure 2. In Figure 2 and Figure 3, the composite container [100] is a so-called pillared container comprising a main unit [101], which consists of a thermosetting resin molding part [102] and a blank sheet [103] retained in a cylindrical shape, and a bottom part [111].

[0014] The thermosetting resin molding part [102] of the main unit [101] comprises: a pillar part [102a] provided at the joining part at which the ends, [103a] and [103b], of the blank sheet [103] are butted together; a flange part [102b] provided on the open end at the lower part of the blank sheet [103] retained in a cylindrical shape; a shoulder part [102c] provided on the open end [103c] at the upper part of the blank sheet [103]; and a tap-equipped opening part [102d] protruding at the approximate center of the shoulder part [102c]. For example, a cap or a cap equipped with a pump (indicated by the imaginary line in Figure 1) is screwed onto the tap-equipped opening part [102d], and the interior of the composite container becomes sealed tightly.

[0015] The main unit [101] consisting of such a thermosetting resin molding part [102] and a blank sheet [203] can be manufactured by the above-described manufacturing device. The blank sheet has, for example, a 3-layer structure consisting of polyethylene(PE)/paper/polyethylene(PE), a 5-layer structure consisting of polypropylene(PP)/PE/paper/PE/polypropylene(PP), or a 5-layer

structure consisting of PE/paper/adhesive layer/aluminum(Al) layer/PE.

[0016] Moreover, the bottom part [111] is made up of the flange part [112], which is formed around the bottom-part blank sheet [113] by means of a thermosetting resin, and is formed separately from the main unit [101]. Moreover, the flange part [112] is firmly attached to the inner periphery of the flange part [102b] of the main unit [101] and is thus united with the main unit [102]. The firm attachment between the inner peripheries of the flange part [102b] and the flange part [112] can be achieved by various methods including a heat-sealing technique, ultrasonic sealing technique, and a technique in which they are screwed together by means of thread parts provided to them in advance.

[0017] As mentioned earlier, the ultrasonic sealing technique can be utilized as a means for uniting the flange part [102b] of the main unit [101] and the bottom part [111]. In this case, a projecting part can be provided to the lower-end face of the flange part [102b] of the main unit [101]. Since such a projecting part becomes selectively melted by means of ultrasonic waves, reliable heat sealing can be performed swiftly. Also, it is permissible to provide an L-shaped rim part on the outer edge of the flange part [102b] as in the illustrated example in order to prevent the melted resin from flowing out from between the flange part [102b] and the bottom part [111]. The shape of the above projecting part may be any shape that protrudes such a ring shape, cone shape, etc. The height of the projecting part should preferably be 0.1~0.5mm and the angle of the top part should preferably be 60~120°. Moreover, the projecting part may be provided on the flange part [112] side of the bottom part [111], in which case the lower-end face of the flange part [102b]

is made to be flat.

[0018] Next, by using the manufacture of the main unit [101] of the above-described composite container [100] as an example, the operation of a composite container manufacturing device of the invention will be explained. First, a blank sheet [103] that has been curled by being wrapped around the core [31] in advance as shown in Figure 4 is placed in a prescribed location in the cavity [51]. Then, a melted thermosetting resin is injected into the cavity [51] from the injection gate [41] through the runners [32] as shown in Figure 5. This forms the above-mentioned pillar part [102a], flange part [102b], shoulder part [102c], and tapped opening [102d]. At this time, the blank sheet [103] retained in a cylindrical shape becomes thermally bonded and united with the thermosetting resin forming the pillar part [102a], the flange part [102b], and the shoulder part [102c] at the end parts, [103a] and [103a], the open end [103b] at the lower part, and the open end [103c] at the upper part, respectively.

[0019] Moreover, since it is preferred from the perspective of external appearance that the pillar part [102a] formed by the injection of the thermosetting resin be difficult to detect from the outside of the composite container [100], it is permissible to, for example, minimize the quantity of the resin of the pillar part [102a]. Moreover, as shown in Figure 3, it is permissible to provide a rib [105] on the inner side of the pillar part [102a] in the container in a protruding manner. By providing the protruding rib [105], main units [101] that are overlapped with each other to be stored, transported, etc. prior to being united with the bottom parts [111] can be prevented from being stacked with each

other and can therefore be separated with ease later on.

[0020] Next, as shown in Figure 6, the engagement of the fixed- /4
side attaching plate [11] and the fixed-side template [12], which are engaged and in contact with each other by means of an engagement member (not shown), becomes released, and the fixed-side attaching plate [11] becomes separated from the fixed-side template [12] and the split molds, [21a] and [21b], by means of the biasing member. At this time, the angular pin [13] together with the fixed-side attaching plate [11] moves upward relative to the split mold [21a]. Therefore, the split mold [21a] moves in the direction (to the right in the illustrated example) in which it moves away from the core [31] by sliding on the periphery of the angular pin [13] and on the surface [14a] of the guide member. Although not illustrated in the figures, the split mold [21b] is also provided with a mechanism similar to that of the split mold [21a], and the split mold [21b] also moves in the direction in which it moves away from the core [31] at the same time as the movement of the split mold [21a]. This releases the engagements between the tapped opening part [102d] and the split molds, [21a] and [21b]. As shown in Figure 7, this makes it possible to easily pull out the core [31] together with the main unit [101] of the composite container which is equipped with the tapped opening part [102d] from the fixed-side template [12]. At this time, the stripper plate [36] becomes separated from the fixed-side template [12] while united with the core [31].

[0021] After the core [31] is pulled out from the fixed-side template [12] to a prescribed location, air is fed into the continuous hole [34a] from an external compressed-air feeder (not shown) as illustrated in Figure

8, and the flange part [33a] located at the bottom part inside the cylinder [35a] is thus made to move upward to the top part inside the cylinder [35a]. By this, the push-out pin [33] moves upward inside the core [31] and protrudes upward from the flat surface at the upper part of the core [31]. Therefore, the thermosetting resin [61] remaining inside the core [31] and the runners [32] can be discharged.

[0022] Lastly, the stripper plate [36] is moved upward along the core [31] by using a guide pin [42] as a guide, and the formed main unit [101] of a composite container is removed from the core [31].

[0023] The runners [32] are provided at the upper part of the core [31] in the manufacturing device [1] of the above-described example. However, a manufacturing device of the invention is not limited to this and it is permissible to omit the runners [32].

[0024] Moreover, since it is preferred from the perspective of external appearance that the pillar part [102a] formed by the injection of the thermosetting resin be difficult to detect from the outside of the composite container [100], it is preferred that the core [31] be designed in such a manner that the quantity of the resin of the pillar part [102a] will be minimized. Moreover, as shown in Figure 3, it is permissible to provide a rib [105] on the inner side of the pillar part [102a] in the container in a protruding manner. By providing the protruding rib [105], main units [101] that are overlapped with each other to be stored, transported, etc. prior to being united with the bottom parts [111] can be prevented from being stacked with each other and can therefore be separated with ease later on.

[0025] Moreover, according to the invention, it is permissible to

provide a depressed part [31a], such as that illustrated in Figure 10(A), in the area of the outer periphery of the core [31] that corresponds to the location in which the flange part [102b] of the main unit [101] of the composite container is formed. In this case, if a thermosetting resin is injected into the cavity [51] while the cavity has the blank sheet [103] disposed in it, the flange part [102b] becomes formed and the thermosetting resin becomes filled also in the depressed part [31a]. Moreover, since the main unit [101] of the composite container is engaged with the core [31] at the depressed part [31a] when the core [31] is pulled out of the fixed-side template [12] as shown in Figure 7, it becomes possible to surely pull out the main unit [101] of the composite container as well as the core [31] from the fixed-side template [12]. The main unit [101] of the composite container [100] illustrated in Figure 3 was formed by using such a core.

[0026] [Effects of the Invention]

As described in detail earlier, according to the invention, a thermosetting resin is injected into the cavity formed between the fixed-side template and the core in order to form a composite container integrated with a blank sheet, and the composite container becomes separated from the core by the split molds, which protrude to the outside of the container, being opened. Therefore, it can be easily removed from the fixed-side template together with the core, and even containers equipped with protruding parts, such as tapped opening parts, that could only be manufactured by means of blow molding in the past can be manufactured as composite containers.

[Brief Explanation of the Drawings]

[Figure 1] A schematic cross-sectional drawing showing one example of a composite container manufacturing device of the invention.

[Figure 2] A perspective drawing showing one example of a composite container.

[Figure 3] A cross-sectional view at the III-III line of the composite container shown in Figure 2.

[Figure 4] A perspective drawing showing one example of a blank sheet used in a composite container.

[Figure 5] A drawing showing a condition in which a melted thermosetting resin has been injected into a cavity in which a blank sheet was disposed in advance.

[Figure 6] A drawing showing a condition in which the fixed-side attaching plate and the fixed-side template are separated from each other and in which the split molds are open.

[Figure 7] A drawing showing a condition in which the core, together with the main unit of the composite container, has been pulled out of the fixed-side template.

[Figure 8] A drawing showing a condition in which compressed air is fed into an air cylinder in order to discharge the thermosetting resin remaining inside the core and the runners.

[Figure 9] A drawing showing a condition in which the main unit of the formed composite container has been removed from the core by the stripper plate being moved upward along the core.

[Figure 10] A magnified cross-sectional drawing of part of the core of a composite container manufacturing device of the invention. Figure

10(A) shows a condition observed prior to injection molding and Figure 10(B) shows a condition in which a thermosetting resin has been injected into the cavity that has a blank sheet disposed in it.

[Explanation of the Reference Numerals]

[1] = composite container manufacturing device

[11] = fixed-side attaching plate

[12] = fixed-side template

[21a], [21b] = split mold

[31] = core

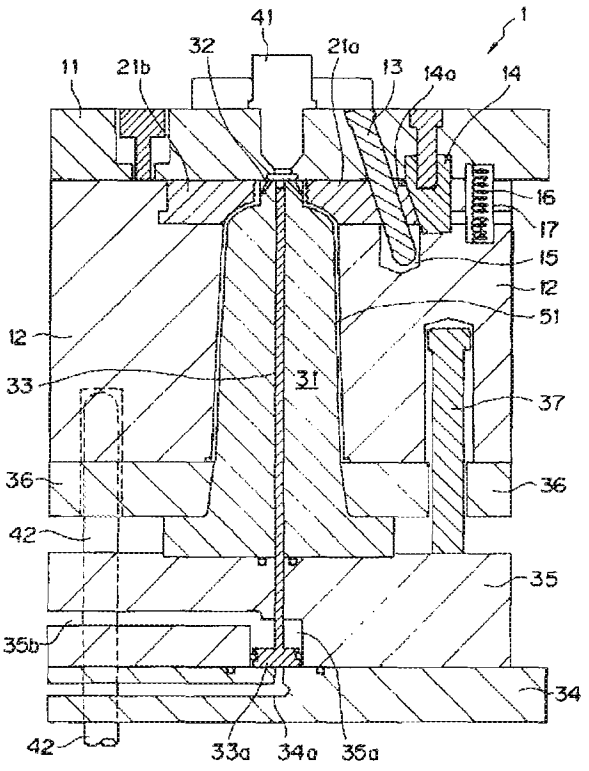
[33] = push-out pin

[51] = cavity

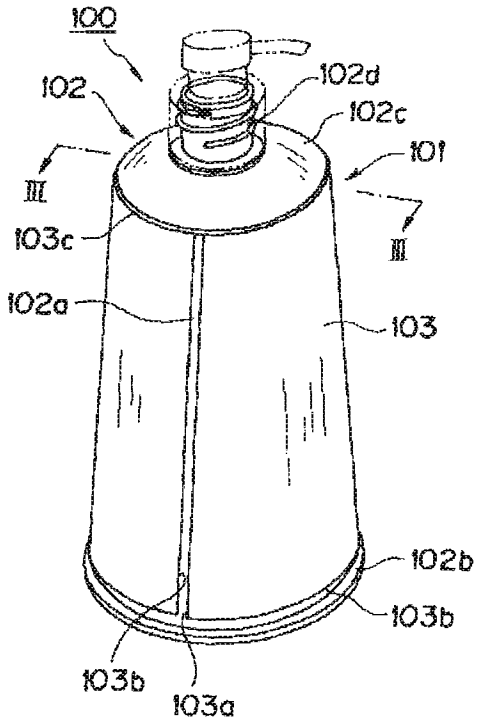
[100] = composite container

[103] = blank sheet

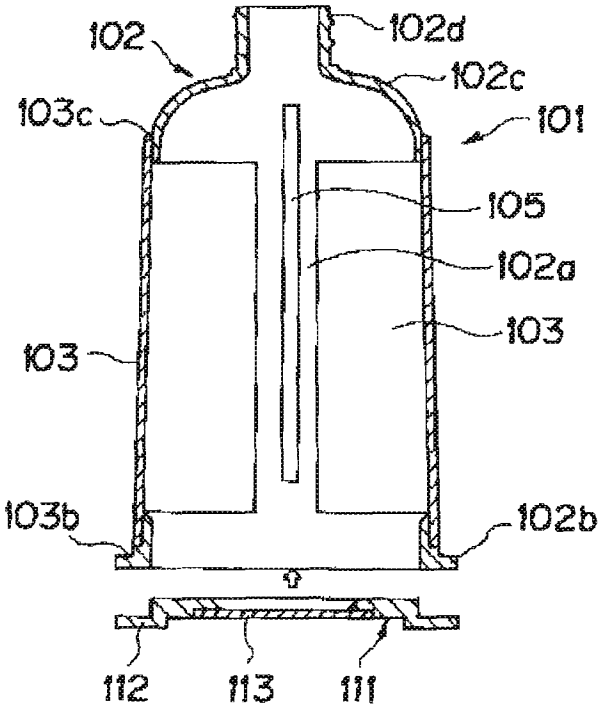
[Figure 1]



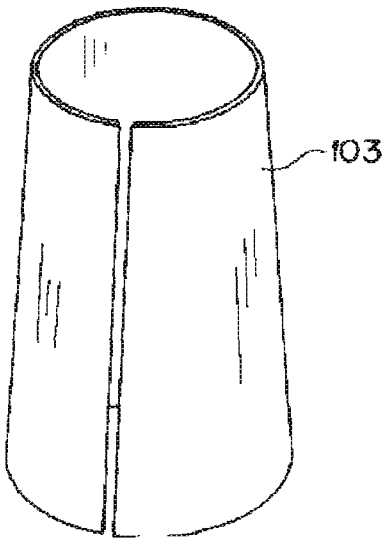
[Figure 2]



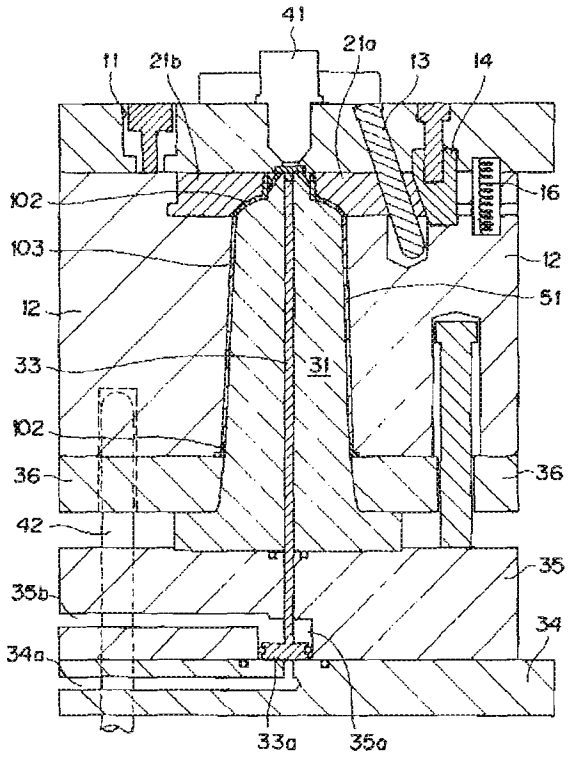
[Figure 3]



[Figure 4]

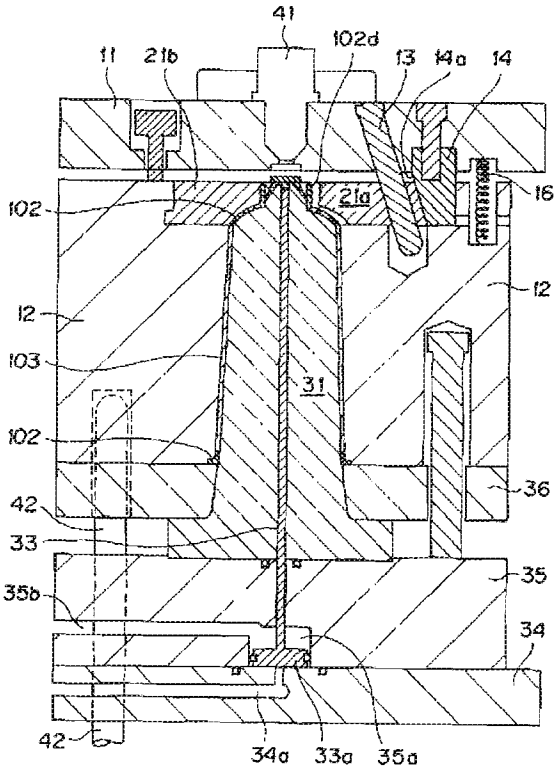


[Figure 5]

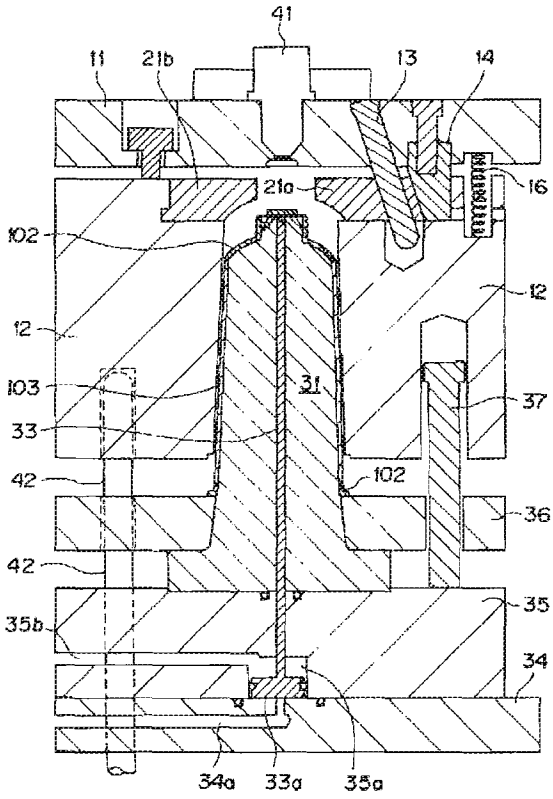


[Figure 6]

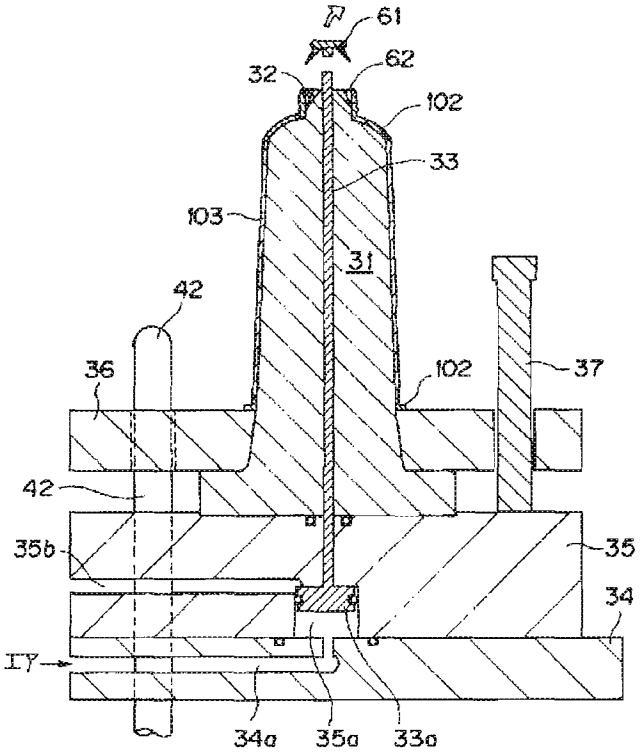
[Figure 7]



[Figure 8]



[Figure 9]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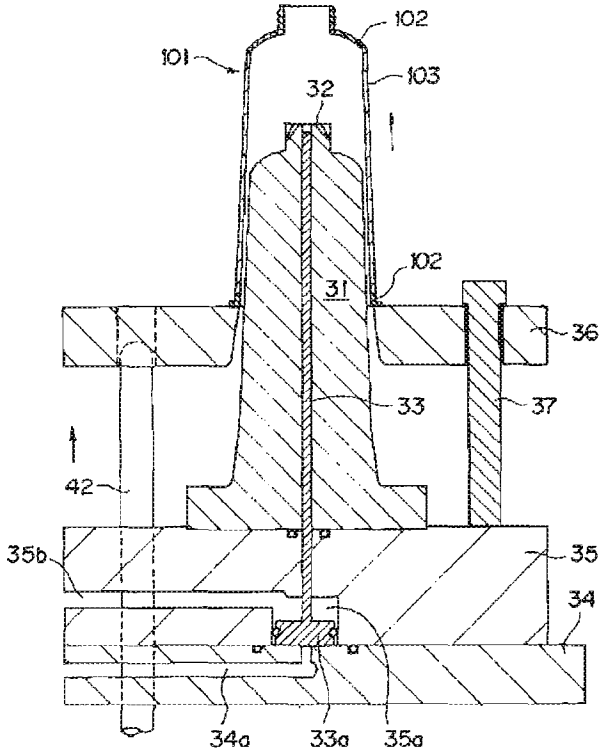
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[Figure 10]